



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,246	08/21/2008	Hiroyuki Kawabata	296907US40PCT	2185

22850 7590 04/22/2011  
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.  
1940 DUKE STREET  
ALEXANDRIA, VA 22314

EXAMINER
----------

SINCLAIR, DAVID M

ART UNIT	PAPER NUMBER
----------	--------------

2835

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

04/22/2011

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com  
oblonpat@oblon.com  
jgardner@oblon.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/594,246	<b>Applicant(s)</b> KAWABATA ET AL.	
	<b>Examiner</b> DAVID M. SINCLAIR	<b>Art Unit</b> 2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Specification***

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 13 is rejected under 35 U.S.C. 102(b) as being anticipated by Chiavarotti et al. (6,325,831).

In regards to claim 13, Chiavarotti '831 discloses

A capacitor electrode sheet in which an aluminum alloy coating layer is integrally formed on at least one surface of a core material made of aluminum foil, wherein a fine structure of the coating layer comprises an intermetallic compound phase and an Al simple substance phase (abstract).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muffoletto et al (6,455,108) in view of JP06-267803A hereafter referred to as Saga.

In regards to claim 1,

Muffoletto '108 discloses a method for manufacturing an electrode sheet for capacitors, the method comprising the step of: thermally spraying mixed powder in which intermetallic compound powder onto a surface of an aluminum foil to thereby form an alloy layer on at least one surface of the aluminum foil (C5:L1-7 & C5:L63 to C6:L22). Muffoletto '108 fails to disclose the mixed powder

Art Unit: 2835

comprising of Al and valve action metal other than Al and Al powder and an alloy layer of Al-valve action metal other than Al.

Saga discloses an anode for a capacitor comprising mixed powder comprising of Al and valve action metal other than Al and Al powder and an alloy layer of Al-valve action metal other than Al ([0007]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the powder mixture taught by Saga to form the anode using the method of Muffoletto '108 to obtain an anode for a capacitor with a large surface area which ensures a large capacitance and a material which forms a stable dielectric layer.

In regards to claim 2,

Muffoletto '108 discloses a method for manufacturing an electrode sheet for capacitors, the method comprising the steps of: supplying a first powder and a second powder from different positions; and thermally spraying both powders onto a surface of an aluminum foil (C5:L1-7 & C5:L63 to C6:L22). Muffoletto '108 fails to disclose the mixed powder comprising of Al and valve action metal other than Al and Al powder and an alloy layer of Al-valve action metal other than Al.

Art Unit: 2835

Saga discloses an anode for a capacitor comprising mixed powder comprising of Al and valve action metal other than Al and Al powder and an alloy layer of Al-valve action metal other than Al ([0007]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the powder mixture taught by Saga to form the anode using the method of Muffoletto '108 to obtain an anode for a capacitor with a large surface area which ensures a large capacitance and a material which forms a stable dielectric layer.

In regards to claim 3,

The references as applied above disclose all the limitations of claim 3 except the thermal splaying is performed by plasma spraying. However, Muffoletto '108 further discloses the thermal splaying is performed by plasma spraying (C4:L53).

In regards to claim 4,

Muffoletto '108 discloses a method for manufacturing an electrode sheet for capacitors, the method comprising the step of: supplying a first powder and a second powder from different positions into a single plasma flow; and thermally spraying the plasma flow onto a surface of an aluminum foil (C5:L1-7 & C5:L63 to C6:L22). Muffoletto '108 fails to disclose the mixed powder comprising of Al

Art Unit: 2835

and valve action metal other than Al and Al powder and an alloy layer of Al-valve action metal other than Al.

Saga discloses an anode for a capacitor comprising mixed powder comprising of Al and valve action metal other than Al and Al powder and an alloy layer of Al-valve action metal other than Al ([0007]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the powder mixture taught by Saga to form the anode using the method of Muffoletto '108 to obtain an anode for a capacitor with a large surface area which ensures a large capacitance and a material which forms a stable dielectric layer.

In regards to claim 5,

The references as applied above disclose all the limitations of claim 3 except comprising the step of rolling the electrode sheet after forming an alloy layer of the Al-valve action metal other than Al. However, Muffoletto '108 further discloses comprising the step of rolling the electrode sheet after forming an alloy layer of the Al-valve action metal other than Al (fig. 4).

In regards to claim 6,

Art Unit: 2835

The references as applied above disclose all the limitations of claim 3 except the step of annealing the electrode sheet after forming an alloy layer of the Al-valve action metal other than Al. However, Muffoletto '108 further discloses the step of annealing the electrode sheet after forming an alloy layer of the Al-valve action metal other than Al (C3:L49-60).

In regards to claim 7,

The references as applied above disclose all the limitations of claim 7 except an average particle diameter of the intermetallic compound powder is 3 to 100  $\mu\text{m}$ , and wherein an average particle diameter of the Al powder is 3 to 150  $\mu\text{m}$ .

However, Muffoletto '108 further discloses an average particle diameter of the intermetallic compound powder is 3 to 100  $\mu\text{m}$ , and wherein an average particle diameter of the Al powder is 3 to 150  $\mu\text{m}$  (C6:L26-29).

In regards to claim 8,

The references as applied above disclose all the limitations of claim 8 except a thermal spraying mass ratio of the intermetallic compound powder and the Al powder (intermetallic compound powder/Al powder) is set so as to fall within the range of 0.1 to 5.



Art Unit: 2835

Saga discloses a thermal spraying mass ratio of the intermetallic compound powder and the Al powder (intermetallic compound powder/Al powder) is set so as to fall within the range of 0.1 to 5 ([0011]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the powder mixture taught by Saga to form the anode using the method of Muffoletto '108 to obtain an anode for a capacitor with a large surface area which ensures a large capacitance and a material which forms a stable dielectric layer.

In regards to claim 9,

The references as applied above disclose all the limitations of claim 9 except powder of intermetallic compounds comprising of Al and one or more elements selected from the group consisting of Ti, Zr, Nb, Ta and Hf is used as the intermetallic compound powder.

Saga discloses powder of intermetallic compounds comprising of Al and one or more elements selected from the group consisting of Ti, Zr, Nb, Ta and Hf is used as the intermetallic compound powder ([0011]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the powder mixture taught by Saga to form the anode

Art Unit: 2835

using the method of Muffoletto '108 to obtain an anode for a capacitor with a large surface area which ensures a large capacitance and a material which forms a stable dielectric layer.

In regards to claim 10,

The references as applied above disclose all the limitations of claim 10 except wherein  $\text{Al}_3\text{Zr}$  powder is used as the intermetallic compound powder.

Saga discloses wherein  $\text{Al}_3\text{Zr}$  powder is used as the intermetallic compound powder ([0011]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the powder mixture taught by Saga to form the anode using the method of Muffoletto '108 to obtain an anode for a capacitor with a large surface area which ensures a large capacitance and a material which forms a stable dielectric layer.

In regards to claim 11,

The references as applied above disclose all the limitations of claim 11 except an alloy foil comprising of Al and valve action metal comprising one or more elements selected from the group consisting of Ti, Zr, Nb; Ta and Hf is used as the aluminum foil. However, Muffoletto '108 further discloses an alloy foil

Art Unit: 2835

comprising of Al and valve action metal comprising one or more elements selected from the group consisting of Ti, Zr, Nb; Ta and Hf is used as the aluminum foil (C5:L1-7).

In regards to claim 12,

The references as applied above disclose all the limitations of claim 10 except a fine structure of the Al-valve action metal alloy layer comprises an intermetallic compound phase and an Al simple substance phase, and wherein an interval of adjacent secondary branches in a dendrite (dendrite crystal) of the intermetallic compound phase is 5  $\mu\text{m}$  or less.

Saga discloses a fine structure of the Al-valve action metal alloy layer comprises an intermetallic compound phase and an Al simple substance phase, and wherein an interval of adjacent secondary branches in a dendrite (dendrite crystal) of the intermetallic compound phase is 5  $\mu\text{m}$  or less ([0008]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the powder mixture taught by Saga to form the anode using the method of Muffoletto '108 to obtain an anode for a capacitor with a large surface area which ensures a large capacitance and a material which forms a stable dielectric layer.

Art Unit: 2835

In regards to claim 13,

Muffoletto '108 discloses a capacitor electrode sheet in which an alloy coating layer is integrally formed on at least one surface of a core material made of aluminum foil (C5:L1-7 & C5:L63 to C6:L22). Muffoletto '108 fails to disclose aluminum alloy and wherein a fine structure of the coating layer comprises an intermetallic compound phase and an Al simple substance phase.

Saga discloses an anode for a capacitor comprising mixed powder comprising of Al and valve action metal other than Al and Al powder and an alloy layer of Al-valve action metal other than Al ([0007]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the powder mixture taught by Saga to form the anode using the method of Muffoletto '108 to obtain an anode for a capacitor with a large surface area which ensures a large capacitance and a material which forms a stable dielectric layer.

In regards to claim 14,

The references as applied above disclose all the limitations of claim 14 except an interval of adjacent secondary branches in a dendrite (dendrite crystal) of the intermetallic compound phase is 5  $\mu\text{m}$  or less.

Art Unit: 2835

Saga discloses an interval of adjacent secondary branches in a dendrite (dendrite crystal) of the intermetallic compound phase is 5  $\mu\text{m}$  or less ([0008]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the powder mixture taught by Saga to form the anode using the method of Muffoletto '108 to obtain an anode for a capacitor with a large surface area which ensures a large capacitance and a material which forms a stable dielectric layer.

In regards to claim 15,

The references as applied above disclose the claimed invention except for a thickness of the core material is 5 to 200  $\mu\text{m}$ , and wherein the thickness of the coating layer is 5 to 150  $\mu\text{m}$ . It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the core material to have a thickness 5 to 200  $\mu\text{m}$  and the coating layer to have a thickness 5 to 150  $\mu\text{m}$  to ensure a small size and large capacitance, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chiavarotti '831 in view of Saga.

Art Unit: 2835

In regards to claim 14,

The references as applied above disclose all the limitations of claim 14 except an interval of adjacent secondary branches in a dendrite (dendrite crystal) of the intermetallic compound phase is 5  $\mu\text{m}$  or less.

Saga discloses an intermetallic compound wherein an interval of adjacent secondary branches in a dendrite (dendrite crystal) of the intermetallic compound phase is 5  $\mu\text{m}$  or less ([0008]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the interval taught by Saga when forming the electrode of Chiavarotti '831 to ensure a large surface area electrode which ensures a large capacitance.

8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chiavarotti '831.

In regards to claim 15,

Chiavarotti '831 discloses the claimed invention except for a thickness of the core material is 5 to 200  $\mu\text{m}$ , and wherein the thickness of the coating layer is 5 to 150  $\mu\text{m}$ . It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the core material to have a thickness 5 to 200  $\mu\text{m}$  and the coating layer to have a thickness 5 to 150  $\mu\text{m}$  to ensure a small size

Art Unit: 2835

and large capacitance, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

9. Claims 16-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muffoletto '108 and Saga as applied to claims 1, 2, 4, & 12-14 above, and further in view of Shimizu et al. (4,468,719).

In regards to claim 16/19/22,

The references as applied above disclose all the limitations of claim 16/19/22 except etching the electrode sheet manufactured by the method as recited in claim 1, 2 or 4, 12, 13 or 14; and then subjecting the etched electrode sheet to an anodizing treatment to form a dielectric skin on the surface of the electrode sheet.

Shimizu '719 discloses an electrode; etching the electrode sheet manufactured; and then subjecting the etched electrode sheet to an anodizing treatment to form a dielectric skin on the surface of the electrode sheet (C7:L30-35 & C9:L31-33).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to etch and anodize the electrode of the combination of Muffoletto '108 and Saga as taught by Shimizu '719 to further increase the surface area of the electrode thus increasing the capacitance and ensuring a low

leakage current.

In regards to claim 17/20/23,

The references as applied above disclose all the limitations of claim 17/20/23 except anode material for electrolytic capacitors manufactured by the method as recited in claim 16/19/22.

Shimizu '719 discloses anode material for electrolytic capacitors manufactured by the method as recited in claim 16 (C7:L30-35 & C9:L31-33).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to etch and anodize the electrode of the combination of Muffoletto '108 and Saga as taught by Shimizu '719 to further increase the surface area of the electrode thus increasing the capacitance and ensuring a low leakage current.

In regards to claim 18/21/24,

The references as applied above disclose all the limitations of claim 18/21/24 except electrolytic capacitor constituted by using the anode materials recited in claim 17/21/23.



Art Unit: 2835

Shimizu '719 discloses electrolytic capacitor constituted by using the anode materials recited in claim 17 (C7:L30-35 & C9:L31-33).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to etch and anodize the electrode of the combination of Muffoletto '108 and Saga as taught by Shimizu '719 to further increase the surface area of the electrode thus increasing the capacitance and ensuring a low leakage current.

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

USPAT 6,544,597

USPAT 5,366,136

USPAT 3,956,676

USPGPUB 2006/0114644

### ***Communication***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID M. SINCLAIR whose telephone number is (571)270-5068. The examiner can normally be reached on Mon - Thurs. 8-4.

Art Unit: 2835

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JAYPRAKASH N. GANDHI can be reached on (571) 272-3740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. M. S./

Examiner, Art Unit 2835

/Eric Thomas/

Primary Examiner, Art Unit 2835